



Appraisal

Critically Appraised Papers

Pulsed electromagnetic fields can reduce pain in the short term in patients with knee osteoarthritis

Synopsis

Summary of: Bagnato GL, Miceli G, Marino N, Sciortino D, Bagnato GF. Pulsed electromagnetic fields in knee osteoarthritis: a double blind, placebo-controlled, randomized clinical trial. *Rheumatology* (Oxford) 2016;55:755-762.

Question: Can daily treatment with pulsed electromagnetic fields decrease pain in patients with knee osteoarthritis? **Design:** A randomised, double-blind, placebo-controlled clinical trial. **Setting:** One Italian rheumatology outpatient clinic. **Participants:** People aged over 40 years with a diagnosis of primary osteoarthritis of the knee according to the American College of Rheumatology criteria; symptomatic disease for the last 6 months with persistent pain defined as a minimal mean score of 40 mm on a Visual Analogue Scale (VAS) despite receiving maximal tolerated doses of conventional medication. Randomisation allocated 33 patients to active treatment and 33 to placebo treatment. **Interventions:** Participants in the treatment group were given a pulsed electromagnetic fields wearable device, while those in the placebo group received a device with no electromagnetic properties. The devices that were used are commercially available and the placebo devices were identical to the active devices, including a light-emitting diode light showing operation. The devices were used 12 hours daily for 1 month. **Outcome measures:** A blinded assessor administered the outcome measures at 1 month (end of treatment): pain measured on a VAS (VAS-pain, 0 to 100); the

Western Ontario and McMaster Universities Osteoarthritis Index, subscale pain (WOMAC-pain); and the Medical Outcomes Study Short-Form 36 version-2 (SF-36) physical and mental component summary scores (0 to 100). **Results:** A total of 60 participants (91%) completed the assessment at 1 month. The mean difference was 13.6 units (95% CI 7.9 to 19.3) in VAS-pain and 5.6 units (95% CI 2.9 to 8.4) in WOMAC-pain, both favouring the active pulsed electromagnetic fields group. There were minor differences in favour of the pulsed electromagnetic fields group in the SF-36 physical health (mean difference 2.7 units, 95% CI 0.3 to 5.2) and the SF-36 mental health (mean difference 0.5 units, 95% CI -1.5 to 2.6). **Conclusion:** In patients with painful knee osteoarthritis, pulsed electromagnetic fields decreased pain, but had little impact on health-related quality of life.

Provenance: Invited. Not peer reviewed.

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Commentary

Despite substantial research on first-line treatment modalities for mild-to-moderate knee osteoarthritis, there are few alternatives that relieve pain and improve function besides drugs and exercise; both show, at best, moderate effects.¹ Due to the side effects of conventional pain-relieving drugs, physical activity and exercise are currently the preferred approaches to improving pain and function. Bagnato and colleagues reported reduced pain with pulsed electromagnetic fields in elderly men and women with symptomatic knee osteoarthritis. The trial had a low risk of bias and the average benefit in pain reduction was probably clinically significant. However, the mechanism behind the effect is not fully understood; it is thought that the treatment gives a beneficial cartilage homeostasis that consequently reduces disease symptoms.

Despite these promising results, there are several considerations that need to be met before this intervention could be recommended for clinical practice. The study had short-term follow-up; therefore, it is unknown if pulsed electromagnetic fields lead to sustained reduction in pain. In addition, the intervention involved using the device for more than 11 hours/day, which raises issues of feasibility. Current pulsed electromagnetic fields studies have used different intervention protocols, thus, it is hard to

compare and synthesise the evidence. Clinical practice guidelines have not recommended electromagnetic therapy, despite controversy in the literature during the last decade.¹ However, based on the results of this trial, pulsed electromagnetic fields therapy is worth considering for patients with mild-to-moderate symptomatic knee osteoarthritis who do not respond to daily physical activity and personalised exercises. A large randomised, controlled trial with a longer follow-up is warranted to confirm the positive effects of pulsed electromagnetic fields reported in this trial.

Provenance: Invited. Not peer reviewed.

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Reference

1. Zhang W, et al. *Osteoarthritis Cartilage*. 2010;18:476-499.

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